

# Large ZT values observed in graphene – polymer composites

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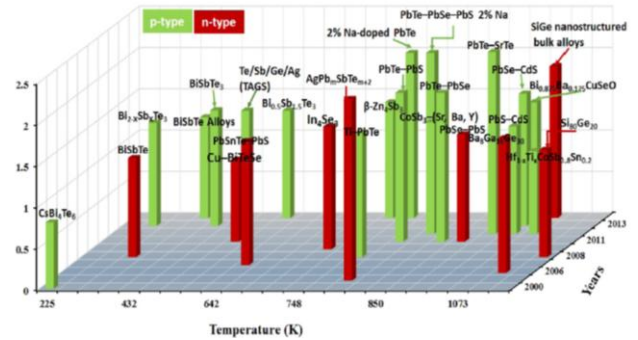
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Nanostructured materials are promising for efficient thermoelectric (TE) conversion [1]. Graphene has the highest thermal conductivity ever measured which combined with its high electrical conductivity (in-plane) does not make it a great candidate for TE applications. In this work TE devices composed of electrochemically exfoliated graphene (EEG) and carbon nanotubes (CNT) heterostructures were investigated. These devices use gold nanoparticles or conducting polymers as a phonon blocking materials. The figure of merit of each device was measured using the Transient Harman Method. Preliminary results show that the figure of merit of the SiO<sub>2</sub> based device can be significantly improved due to the presence of the carbon based heterostructures.

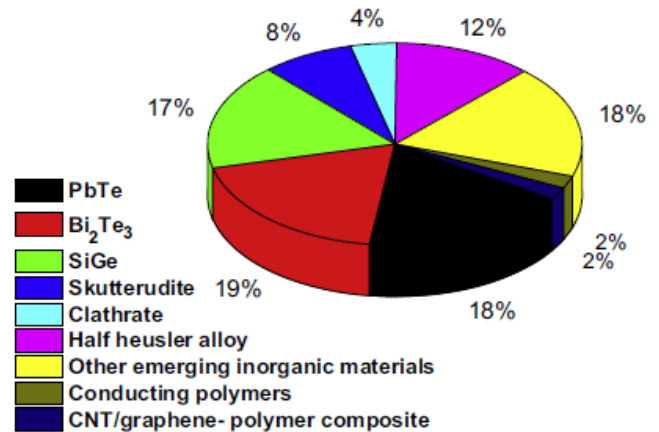
## References

- [1] M. Dresselhaus, J. Heremans, L. Bell and D. Morelli, Nature Nanotechnology, 8, (2013), 471–473
- [2] Fitriani, et.al, Renewable and Sustainable Energy Reviews, 64 (2016) 635-659
- [3] K. Gayner, Progress in Materials Science, 83 (2016) 330-382

## Figures



**Figure 1:** Efficiency of thermoelectric materials [2]



**Figure 2:** Thermoelectric materials including graphene – polymer composites [3]